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**CONTROL SYSTEM AND METHOD FOR CURRENCY EXCHANGE AND
MERCHANDISE SALES**

Background of the Invention

1. Field of the Invention

The present invention relates generally to the field of transactions, and in particular to a system and method for controlling currency exchange and merchandise sales on commercial airliners.

2. Description of the Prior Art

Passengers on commercial aircraft and other vehicles represent commercial opportunities for merchandise sales. For example, on international flights merchandise sales can often be made "duty-free". Duties assessed on various consumer goods can be substantial in a number of countries. Therefore, duty-free sales tend to be relatively popular among international travelers, particularly with relatively expensive, luxury-type items.

Duty-free merchandise inventories can be stowed in the service carts commonly used by airlines for in-flight food and beverage service. The service carts are stocked with merchandise, food and beverages by vendors and caterers at airports for loading on outbound flights. The flight attendants sell duty-free merchandise to passengers in much the same way as beverage sales are handled. Empty carts are offloaded for restocking. Service carts tend to be relatively uniform in size to facilitate stowing in standard-size airliner galleys and to facilitate passing through the aisles. They are subject to applicable

regulations and certifications for airline use. For example, the Federal Aviation Administration (FAA) certifies equipment for use on airliners in the United States. Therefore, an important objective in utilizing service carts for currency exchange and merchandise sales is to avoid modifying the carts. Such modifications, even if allowed, could require FAA recertification.

Service carts on international flights have previously been utilized for currency exchange. For example, U.S. Patent No. 6,003,008 and Des. 406,270, which are assigned to a common assignee herewith, disclose point-of-sale devices for mounting on top of airline service carts. Such devices receive currency and process transactions, including currency exchange and merchandise sales. However, more compact equipment is desirable to comply with airliner weight restrictions and size limitations.

Currency conversion represents another type of commercial opportunity among airline passengers. Relatively high percentages of international travelers convert currency. Although currency conversion transactions can be conducted in both the originating and destination countries, in-flight conversion tends to be considerably more convenient than the alternative of locating a financial institution before or after traveling. Moreover, in-flight currency exchange can accommodate passengers' needs for local currency for ground transportation and other needs on arrival.

Duty-free sales and foreign currency exchange provide revenue for airlines and other entities which receive portions of the profits generated by merchandise sales and foreign currency exchange. Although such transactions have a number of advantages for

1 passengers, airlines and vendors, several difficulties are typically encountered in providing
 2 merchandise sales and currency exchange. For example, space limitations significantly
 3 restrict the types of merchandise which can be loaded into service carts. Therefore, the
 4 merchandise stocked in the service carts tends to be relatively small and high-value.
 5 Examples include watches, perfumes, liquor, cigarettes, electronics and other luxury-type
 6 items which are typically associated with relatively high duties.

7 Security and accountability for currency and merchandise are also concerns. They
 8 assume even greater significance when foreign currency exchange services are offered
 9 because the inventory must include additional cash of various denominations.

10 Other problems arise from multiple flight crews handling the service carts and the
 11 merchandise and currency stocked thereon. Since different flight crews are often involved
 12 in outbound, intermediate and return flights, responsibility for goods and currency must be
 13 transferred at different stations in route. Still further, currency inventory utilized for
 14 conversion and making change for merchandise sales represents assets which are tied up
 15 and at risk to the provider.

16 The present invention addresses the shortcomings of the prior art. Heretofore,
 17 there has not been available a system and method for controlling currency exchange and
 18 merchandise sales with the advantages and features of the present invention.

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Summary of the Invention

In the practice of the present invention, a system is provided for controlling currency exchange and merchandise sales aboard commercial airline flights. The system includes a point-of-sale (POS) computer which is carried on board the aircraft for use by air crew members in conducting currency exchange and merchandise sales transactions. Inventory and transactional data are transferred preflight and post-flight between the POS computer and a cash/currency processing computer (CPC) located remotely from the aircraft. The control system is particularly adapted for use in conjunction with airline service carts stocked with merchandise and mounting security drawers for currency. In the practice of the method of the present invention, currency and merchandise are inventoried preflight by the CPC computer, data therefrom is loaded into the POS computer, currency exchange and merchandise sales transactions are recorded by the POS computer in-flight, reports are generated by the POS computer post-flight and the CPC computer receives flight-related data from the POS computer. Transaction and ending inventory reports are generated post-flight for reconciling with preflight reports. Additional reports are generated for documenting profits and losses, currency exchange and merchandise sales historical data and discrepancies between beginning and ending inventory balances.

Objects and Advantages of the Invention

1 The principal objects and advantages of the present invention include: providing a
2 system for controlling currency exchange and merchandise sales; providing such a system
3 which is adapted for use on board commercial airline flights; providing such a system
4 which utilizes existing airline service carts for stocking merchandise and currency
5 inventories; providing such a system which utilizes a touch-screen, point-of-sale (POS)
6 computer on board the aircraft for recording inventories preflight and transactions in-
7 flight; providing such a system which utilizes a cash/currency processing computer (CPC)
8 located remotely from the aircraft for transferring data to and from the POS computer;
9 providing such a system which is secure; providing such a system which is relatively easy
10 to operate; providing such a system which utilizes readily available equipment; providing
11 such a system which utilizes existing airline service carts without modifying same;
12 providing a method of controlling currency exchange and merchandise sales; providing
13 such a method which reduces the risk of currency or merchandise loss; providing such a
14 method which performs preflight inventory functions; providing such a method which
15 records transactions in-flight; and providing such a method which generates reports and
16 reconciles beginning and ending inventories post-flight.

Brief Description of the Drawings

Fig. 1 is a block diagram of a system for controlling currency exchange and merchandise sales embodying the present invention.

Fig. 1a is an upper, perspective view of a service cart with a security drawer for use with the control system of the present invention.

Fig. 2 is a flowchart of a method for controlling currency exchange and merchandise sales embodying the present invention.

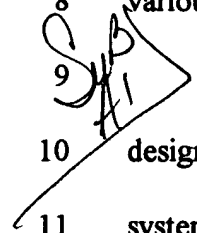
Fig. 3 is a flowchart of a procedure for in-flight technical documentation of currency exchange and merchandise sales transactions.

Figs. 4a-22 are screen displays and documentation of the control system and method.

1 **Detailed Description of the Preferred Embodiments**

2 **I. Introduction and Environment**

3 As required, detailed embodiments of the present invention are disclosed herein;
4 however, it is to be understood that the disclosed embodiments are merely exemplary of
5 the invention, which may be embodied in various forms. Therefore, specific structural and
6 functional details disclosed herein are not to be interpreted as limiting, but merely as a
7 basis for the claims and as a representative basis for teaching one skilled in the art to
8 variously employ the present invention in virtually any appropriately detailed structure.

9  Referring to the drawings in more detail, the reference numeral 2 generally
10 designates a foreign currency exchange (FX) and merchandise sales system (Fig. 1). The
11 system 2 generally includes a service cart 4 with a locking security drawer 4a (Fig. 1a) for
12 receiving currency 6 and merchandise 8. The security drawer 4a is the subject of
13 copending U.S. Patent Application Serial No. _____, which is assigned to a
14 common assignee herewith and is incorporated herein by reference.

15 Without limitation on the generality of useful applications of the control system 2
16 and the control method, an application in a commercial airliner 10 is shown and described.
17 The aircraft 10 operates out of originating and nonoriginating stations 12, 14 respectively.
18 A point-of-sale (POS) computer 9 is utilized on the aircraft 10 for recording the
19 transactions involving the currency 6 and the merchandise 8. Without limitation on the
20 generality of suitable computing devices, hand-held, touch-screen computers available

1 from TouchStar Technologies, LLC of Tulsa, Oklahoma. Suitable programming is
2 available from Novo ivc of Warwickshire, England. Data from the POS computer 9 is
3 stored on an FX PC card 11 and a merchandise PC card 13 for transfer to a cash/currency
4 processing computer (CPC) 15 which can be located remote from the aircraft and airports.

5 **II. Method for Currency Exchange and Merchandise Sales**

6 Fig. 2 is a flowchart of the method of the present invention. A service provider
7 determines the currency inventory at 18 based on such factors as the origin and destination
8 of the flight, aircraft type, passenger load, historical sales penetration, average historical
9 transaction amounts, input from air crews, time of flight and business/pleasure passenger
10 mix.

11 The merchandise vendor determines the merchandise inventory at 20, which
12 generally consists of relatively expensive, small goods likely to appeal to international
13 travelers. Size restrictions imposed by the service carts 4 significantly affect the
14 merchandise inventory. Currency data is loaded on the FX PC card 11 at 22 and
15 merchandise inventory data is loaded on the merchandise PC card 13 at 24. The FX and
16 merchandise cards 11, 13 are inserted in the POS computer 9 at 26. One or both of the
17 FX and merchandise cards 11, 13 can be utilized depending on the availability of FX or
18 merchandise sales or both on a particular flight.

19 FX and merchandise sales transactions are recorded on the POS computer 9 at 28.
20 The POS computer 9 identifies the inventory and reconciles the transactions at the end of

the flight at 30 and generates appropriate reports at 32. The merchandise sales data is provided to the merchandise vendor at 34 and the service provider receives transaction data (i.e., both FX and merchandise sales transactions) at 36. Revenues are allocated among the airline, service provider and merchandise vendor at 38.

III. In-Flight Technical Documentation

Fig. 3 shows a procedure for in-flight technical documentation of the method of the present invention. Support files are loaded in the POS computer 9 at 42. Application forms are loaded at 44 and can include a card load form allowing a user to enter information needed to load the POS PC cards 11, 13; a form reading data from the POS PC card 11 for reconciling currencies from the flight and a history form for producing a listing of all transactions.

Application reports are generated at 46 and include a flight summary report, a listing of currencies returned from a flight, a listing of credit card transactions that occurred during the flight, a listing of all currencies expected and actual amounts, a listing of transactions from the flight, a listing of rates for currencies being sold and tendered and history reports. Text files are generated at 48 and include an archive comprising a complete copy of the data used to reconcile flight, a journal consisting of entries to be entered into the system and a history file with a transaction listing used for historical and/or marketing purposes.

1 Batch procedures are run at 50 and include creating rate files to be sent to all
2 CPC's, loading historical transaction data and a data extraction section. Files are copied
3 from the POS computer 9 at 52 and are transmitted to the CPC 15 for processing.
4 Reconciliation occurs at 54.

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6 **IV. In-Flight User Documentation**

7 Fig. 4a shows a Main Screen for loading necessary data such as currencies,
8 currency spot rates, currency pricing and beginning inventories of currencies packed in the
9 security drawer 4a and onto a PC card 11 or 13. When the data is transferred to the PC
10 card 11 or 13, the card loading process is complete and the cash bag data is deleted from
11 the database, which is thereby readied for a new flight. The card load form also allows
12 users to input and maintain information on airlines' flight schedules, currencies, currency
13 spot rates and currency pricing. Fig. 4b shows the toolbar functions therefor.

14 Fig. 5a shows an Airlines Screen which allows the user to enter and maintain
15 identifying information about the airlines which utilize the FX and merchandise sales
16 services. The user can enter new records, update existing records or delete existing
17 records. Upon entry to the screen, existing airlines' data is populated automatically.
18 Fig. 5b shows the information managed by the Airlines Screen.

19 Fig. 6a shows a Flight Screen used to enter information about the flights on which
20 the service provider will be providing FX services. The user enters flight numbers,

1 origination airports and destination airports. The records can be entered and existing
 2 records updated or deleted from this screen, whereupon existing flights' data is populated
 3 automatically. Cash bag data being loaded onto a PC card 11 or 13 must be finished or
 4 reset through the Cash Bag Screen before deleting a flight. Fig 6b shows the information
 5 managed by the Flight Screen.

6 Fig 7a shows a Currency Screen which allows a user to enter information about
 7 the currencies and crew discount currencies for which the service provider offers FX
 8 services. The information entered will be used in building the files used by the POS
 9 computer 9 to perform the FX and the merchandise sales transactions. Crew currencies
 10 for providing air crew members with a discount are also entered in this screen, with the
 11 crew currencies being distinguished from the "real" (i.e., nondiscounted) currencies by a
 12 character (e.g., "Z") at the beginning of the currency code. The information managed by
 13 the Currency Screen is shown in Fig. 7b.

14 Fig. 8a shows a Rates Screen for entering and retaining current spot rates for each
 15 of various currencies. Crew currencies, if applicable, can also be entered and maintained
 16 on this screen. Rate information is in a "per dollar" format and can be entered
 17 periodically, e.g., daily. Fig. 8b shows the information managed by this screen.

18 Fig. 9a shows a Pricing Screen allowing a user to enter and maintain transaction
 19 fees, par fees and spreads for each currency that is applied to an FX or merchandise sales
 20 transaction. The information is maintained according to flight origin and destination, and

generally will not change on a frequent basis. If applicable, crew currencies can also be maintained on this screen. Fig. 9b shows information managed by this screen.

Fig. 10a shows a Cash Bag Screen for entering currency inventories that will be loaded onto a flight for a single POS computer 9. A specific set of files containing data is loaded onto a PC card 11 or 13 prior to the flight. Data entered on the screen is used to build the required files on the PC card 11 or 13. Fig. 10b shows the information managed by this screen.

Fig. 11a shows a Validate Screen for performing a final check on information entered from the Cash Bag Screen. The cash information for each individual flight can be viewed. Dates, currencies and start totals can be modified if they were originally entered in the Cash Bag Screen. A Bart Report (Figs.14a,b, discussed below) is run for the use of the flight crew to load rate information. The user is given the option of loading the data on a duplicate, backup PC card. Fig. 11b shows the information managed by this screen.

Fig. 12a shows a PC Card screen. The PC Card screen is used to upload the data from a PC card 11 or 13 into the local database. Fig. 12b shows the fields displayed in the PC Card screen.

Fig. 13a shows a Reconcile Screen which allows the user to enter quantities of each denomination of a currency being counted after it has returned to the originating station 12 and been uploaded into the CPC 15 database for reconciling currency amounts removed from the aircraft at the end of the flight, based on beginning currency amounts

1 and all in-flight transactions. Reconciliation is performed for all POS computers 9 and all
2 cash bags on a particular round trip. Fig. 13b shows the fields displayed by the Reconcile
3 Screen.

4 Fig. 14a shows a Bart Report displaying currencies that are going to be sold at a
5 rate against the currencies that are going to be tendered for a particular flight. This
6 information is used by flight attendants to announce what the rates are for the currencies
7 that are going to be sold in-flight. Fig. 14b shows rate information for announcing by a
8 flight attendant.

9 Fig. 15 shows an Inventory Report (INV) listing the currencies that were counted
10 and the total number of notes in each denomination for logging the currencies back into
11 the inventory system.

12 Fig. 16 shows a Flight Summary Report (SUM). The Flight Summary Report is a
13 general summary of currencies exchanged during the flight including separate line items
14 for each currency's transactions of FX, merchandise sales, travelers' checks and credit
15 cards. Net gain or loss is calculated and displayed. Crew currency is added into the base
16 currency.

17 Fig. 17 shows a Credit Card Report (CCD) listing all credit card transactions used
18 to purchase currency on a particular flight.

19 Fig. 18 shows a Transaction Detail Report (TRX) with a list of all FX and
20 merchandise sales transactions performed during a round trip. USD (U.S. dollars) values

